

## CLAIMS

What is claimed is:

- 1           1.     A method for dithering a desired signal having a frequency band, the  
2 method comprising:  
3           generating a noise signal;  
4           amplifying the noise signal;  
5           filtering the amplified noise signal, so as to prevent that noise signal from adversely  
6           affecting the frequency band of the desired signal; and  
7           diplexing the filtered noise signal with the desired signal to produce a signal+noise  
8           signal.
- 1           2.     The method of claim 1 further comprising:  
2           providing the signal+noise signal to a noise-based application.
- 1           3.     The method of claim 2 wherein the noise-based application is a data  
2 conversion process.
- 1           4.     The method of claim 1 wherein the noise signal is thermal noise.
- 1           5.     The method of claim 1 wherein filtering the amplified noise signal includes  
2 low-pass filtering that noise signal.
- 1           6.     The method of claim 1 wherein diplexing the filtered noise signal with the  
2 desired signal to produce a signal+noise signal includes providing insertion loss associated  
3 with the desired signal and the noise signal of 1 dB or less.
- 1           7.     A method for dithering a desired signal having a frequency band, the  
2 method comprising:  
3           generating a noise signal;  
4           amplifying the noise signal; and

5 combining the amplified noise signal with the desired signal to produce a  
6 signal+noise signal, wherein both the desired signal and the noise signal  
7 experience insertion loss of 3 dB or less.

1 8. The method of claim 7 wherein amplifying the noise signal further includes:  
2 filtering the noise signal, so as to prevent the noise signal from adversely affecting  
3 the frequency band of the desired signal.

1 9. The method of claim 8 wherein filtering the noise signal includes low-pass  
2 filtering that noise signal.

1 10. The method of claim 7 wherein combining the amplified noise signal with  
2 the desired signal further includes combining a second noise signal, and the desired signal  
3 + noise signal includes the second noise signal.

1 11. The method of claim 7 further comprising:  
2 providing the signal+noise signal to a noise-based application.

1 12. The method of claim 11 wherein the noise-based application is a data  
2 conversion process.

1 13. The method of claim 7 wherein the noise signal is thermal noise.

1 14. The method of claim 7 wherein the insertion loss experienced by the noise  
2 signal is less than 1 dB.

1 15. A self-contained dithering device comprising:  
2 a noise source adapted to generate a noise signal;  
3 an amplification stage adapted to amplify the noise signal; and  
4 a diplexer adapted to diplex the filtered noise signal with the desired signal to  
5 produce a signal+noise signal that can be used in a data conversion process.

1           16.    The device of claim 15 wherein the amplification stage is further adapted to  
2 filter the noise signal, so as to prevent that noise signal from adversely affecting the  
3 frequency band of the desired signal.

1           17.    The device of claim 15 wherein the amplification stage further includes one  
2 or more active low-pass filters adapted to filter the noise signal.

1           18.    The device of claim 15 wherein the noise signal is thermal noise.

1           19.    The device of claim 15 wherein the diplexer provides an insertion loss  
2 associated with the noise signal that is 1 dB or less.

1           20.    The device of claim 15 wherein the device is contained in a package having  
2 a power input, a desired signal input, a signal+noise output, and a common.